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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/791,024	03/02/2004	Cornelis L. G. Ham	PHN 17333A	1273
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DATE MAILED: 10/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

AK

<b>Office Action Summary</b>	Application No. 10/791,024	Applicant(s) HAM ET AL.	
	Examiner Tiffany A. Fetzner	Art Unit 2859	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07/18/2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-7,9-14,19 and 20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-14,19 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |  |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. <u>09/28/2005</u> . |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                    | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____. | 6) <input type="checkbox"/> Other: _____.  |

### DETAILED RCE ACTION

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on July 18<sup>th</sup> 2005 has been entered.
2. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.
2. **Applicant cannot rely upon the foreign priority papers to overcome this rejection** because a certified English translation of said papers has not been made of record in accordance with 37 CFR 1.55. [See MPEP § 201.15.] Therefore, in the course of the rejections which follow, applicant's US filing date of March 2nd 2000 is considered to be the priority date of the instant application.
3. The examiner also notes that the effective US priority date of the **Hasson et al.**, reference is earlier than applicant's foreign priority date.

### **Response to Arguments**

4. Applicant's arguments filed July 18<sup>th</sup> 2005 have been fully considered but they are not persuasive. Applicant has amended claim 1 as per the July 18<sup>th</sup> 2005 amendment and response, [See the July 18<sup>th</sup> 2005 arguments on page 9 paragraph 2], to include the features of: "generating a gradient magnetic field to adjust the main

magnetic field with a compensation signal" and generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength." However a thorough review of applicant's original disclosure fails to provide support for the argued amended features. This is a 35 USC 112 first problem caused by applicant's July 18<sup>th</sup> 2005 amendment itself.

5. No where in applicant's original disclosure does applicant describe the amended features of : "generating a gradient magnetic field to adjust the main magnetic field with a compensation signal" and generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength" (i.e. of the main magnetic field).

6. Additionally, there is a discrepancy between what is argued on page 9 paragraph 2, and the actual claim recitation. In order for the argument to match the claim, the amended limitation of : "generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength" should have the words "**of the main magnetic field**" after strength, so that the limitation would be generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength **of the main magnetic field**.

7. The recitations concerning the gradient coils in the original specification, other than stating the gradients are provided in the Gx, Gy and Gz directions which is the normal, conventional standard are as follows:

A) on page 2 lines 9- through page 3 line 2 applicant teaches:

"According to a preferred version of the method in accordance with the invention, the electric signal applied to the gradient magnetic field coil, or to each **gradient magnetic field coil**, is determined as the characteristic quantity. This version is based on the recognition of the fact that in practice the waveforms of the **signals in the gradient field coil, or each gradient field coil, are accurately known, so that the thermal behavior of a gradient field coil is also known. This means that for a given gradient waveform, at which electric power is dissipated in the coil, the magnetic properties of the magnetizable material used therein or interacting therewith will**

vary in conformity with a given mathematical model because of induction effects such as eddy currents. The exact effect on the field strength of the main magnetic field can be calculated for a given quantity and configuration of the magnetizable material. This is possible notably when the main magnet is composed of superconducting or practically superconducting coils with a negligibly low power dissipation. When the main magnet itself includes a field coil which has a resistance which is not negligibly small with a view to power dissipation, the effect of the thermal behavior of the magnetizable material on the variation and the strength of the main magnetic field can be further determined by measuring a relevant further quantity which is characteristic of the variations of the magnetic properties of the magnetizable material, for example, the electric power dissipated in the main magnetic field coil."

8. The examiner notes that this paragraph fails to teach **generating a gradient magnetic field to adjust the main magnetic field with a compensation signal**" and generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength of the main magnetic field." All this paragraph states with respect to gradient coils is that the waveform they produce and there thermal behavior is known to vary in accordance with an established mathematical model, and vary according to the induced eddy currents, so that the eddy current effect on the main magnetic field can be calculated for a given quantity and configuration of magnetizable material. This paragraph does not state **generating a gradient magnetic field to adjust the main magnetic field with a compensation signal**" or **providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength** of the main magnetic field the gradient magnetic field. is generated in order to adjusted

B) On page 3 lines 14-28 applicant teaches:

"It is notably when no direct mathematical relationship exists between variations in the main magnetic field which are due to variations of the magnetic properties of one or more of the gradient field coils, that according to another version yet of the method in accordance with the invention use can be made of a look-up table in which the relevant functional relationship is taken up. The input parameter is the measured characteristic quantity and whereas the output parameter is formed by the compensation signal or representations thereof. *In the case of main magnetic*

*field coils which are not composed of superconductors, **the main magnetic field can be compensated by controlling the electrical energizing of the main magnetic field coil** by means of the compensation signal determined in accordance with the invention. The main magnetic field can thus be kept constant without requiring the use of further compensation coils and the like. However, the invention can also be used for devices which are provided with supplementary coils, so-called Bo coils, for the compensation of variations of the main magnetic field."*

9. The examiner notes that a compensation for the gradient coil fluctuations is determined via a look-up table but nowhere is the gradient coil adjusted to control the main magnetic field. Applicant's own teachings even teach away from this stating that **"the main magnetic field can be compensated by controlling the electrical energizing of the main magnetic field coil by means of the compensation signal determined in accordance with the invention."** [See the full citation above.]

C) On page 4 lines 29-30 applicant teaches:

"A compensation signal thus generated is capable of eliminating undesirable variations of the field strength, affecting the quality of the image, to a high degree."

10. The examiner notes that this teaching provides support for a compensation field eliminating undesirable variations, but does not support "an adjustment to the generated gradient magnetic field" as the means for carrying out this compensation.

D) On page 5 lines 22-34 applicant teaches:

"A magnet system 2 is provided so as to generate a steady magnetic field or main magnetic field B in the receiving space 1; it includes one or more steady field coils or main magnetic field coils which are composed of superconductors or conductors having a resistance which is not negligibly small in respect of power dissipation. **A gradient magnetic field G can be superposed on the main magnetic field B in the receiving space 1 by means of gradient field coils 3 which may be arranged between the main magnetic field coils. Generally speaking, the gradient field coils 3 are arranged to produce a gradient magnetic field in the x, the y and the z direction of a Cartesian system of co-ordinates. The z-axis is then chosen to be coincident with the direction of the main magnetic field B.** A given cross-section or slice 11 of the body in the receiving space 1 can be selected by appropriate control of the gradient field coils 3 by means of energizing means 4 which are capable of producing predetermined energizing signals such as current waveforms  $I_{x,y,z}$ . The magnet system 2 is energized by a power supply or energy source 5."

11. The examiner notes that this paragraph teaches using the gradient coils to provide/encode MRI data in three known x, y, z directions; which are conventionally applied while the main static magnetic field is present, because to detect an NMR or MRI response signal the resonance must be provided while a static magnetic field is present, as is well known. This teaching **does not state** that adjusting the generated gradient fields compensate for main magnetic field variations.

E) On page 6 lines 23-26 applicant teaches:

"In order to compensate field strength variations of the main magnetic field B, auxiliary magnetic field coils or Bo coils 8 are used in practice. Such Bo coils 8 are driven, via the processing means 10 and the energizing means 9, in such a manner that the Bo field compensates variations of the main magnetic field B as well as possible."

12. The examiner notes that this teaching contradicts the feature applicant has amended to the claims in the July 18<sup>th</sup> 2005 response because the teaching states that it is the auxiliary magnetic field coils, (i.e. not the gradient coils), which provide an adjustment energizing means to compensate for main magnetic field fluctuations.

F) On page 6 lines 27-32 applicant teaches:

"The energizing signals  $I_{x,y,z}$  of the gradient field coils 3 are accurately known in the practice of forming an image of an object. Because the device itself and its immediate vicinity, i.e. the shield 13, are steady, the interaction between the gradient magnetic fields and the magnetizable material 12, 13, and hence the temperature variations therein which are due to induction, eddy currents etc., can be derived directly from the energizing signals  $I_{x,y,z}$  of the gradient field coils 3 in conformity with the idea of the invention."

13. The examiner notes that this paragraph also fails to teach **generating a gradient magnetic field to adjust the main magnetic field with a compensation signal**" and generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength of the main magnetic field." Because this paragraph only teaches, with respect to the gradient coils, that the interactions between the

gradient magnetic fields and the magnetizable material 12 and the temperature variations due to induction, eddy currents, etc., can be **derived from** the energizing signals  $I_{x,y,z}$  of the gradient field coils 3. This teaching also fails to teach adjusting the gradient magnetic fields generated in order to compensate the main magnetic field for the temperature variations due to induction, eddy currents, etc from derived energizing signals  $I_{x,y,z}$  of the gradient field coils alone. (i.e. excluding an adjustment to any main magnetic coil component.)

14. The examiner also notes that applicant has admitted in the Remarks of the July 18<sup>th</sup> 2005 response on page 9 paragraph 2 that that the **Hasson** "adjustment signal is transmitted directly to the solenoid main field coil, where current is based on fluctuation in field strength, indicated by the NMR response, which response is driven by the current input and correlated with the adjustment factor," which is the same as the teachings on page 6 lines 23-26 and page 7 lines 10-18 of the original specification, where the  $B_0$  coils, (i.e. not the gradient coils) are energized and adjusted on the basis of the compensation signal.

"The signal supplied by the measuring means 15 is applied to the processing means 10 in order to determine therefrom a compensation signal which is a measure of the variations in time of the main magnetic field B.

When the effect of the varying magnetic properties of the magnetizable material 12, 13 on the main magnetic field B is known, and also the iron content, the degree of compensation can be determined therefrom in order to keep the steady magnetic field B constant. In order to keep the main magnetic field B constant, the processing means 10 can suitably control the energizing means 9 for the  $B_0$  coils 8 on the basis of the compensation signal." [See Original specification **page 7 lines 10-18**].

**G)** On page 8 lines 4-6 applicant teaches:

"Block 29,  $B(I_{x,y,z})$  represents the effect exerted on the main magnetic field B by the temperature variations of the magnetizable material of the device which are caused by the current waveforms  $I_{x,y,z}$  in the gradient magnetic field coils 3, block 23."

15. Contrary to supporting applicant's amended feature this paragraph simply reiterates the fact that the energized gradient currents **cause** (i.e. not compensate for) a main source of the variations of the Main  $B_0$  static magnetic field



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G) Lastly On page 8 lines 14-17 applicant teaches:

"The compensation signal generated by the weighting means 20 can be used for compensating the main magnetic field B via the Bo coils 8 and/or for suitably adapting the frequency of the RF oscillator means 19. In the case of main magnetic field coils the influencing of the main magnetic field can also take place via the energizing means 5."

16. The examiner notes that component 5 is the magnet system 2 power supply or energy source as per the teachings of page 5 lines 33-34. It is not the gradient coil energizing means, so there is no support within applicant's original disclosure for the compensation signal, which corrects the variations of the main magnetic field, to be generated by an adjustment to the gradient coil energizing means, which in the original specification is component 4.

17. Therefore, the original specification, contrary to applicant's arguments in the July 18<sup>th</sup> 2005 response, does not teach, suggest, or show, the features recited in **applicant's amended claim 1.**

18. The Examiner agrees that the applied prior art of Record, (i.e. **Hasson et al.**, US patent 6,566,875 B1 issued May 20th 2003 originally filed June16th 1999, with an effective US priority date of Feb. 23<sup>rd</sup> 1999) does not teach the amended features of **claim 1**, but the examiner cannot find support for applicant's teachings of these limitations either.

### ***Claim Rejections - 35 USC § 112***

19. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

20. **Claims 1** and subsequently all pending **dependent claims (2-7, 9-14, 19, and 20)**, are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter **NEW matter** which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. All new matter should be removed from the

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pending claims, with the next response, or applicant must provide citations which show that applicant's newly added amended features, were present within the original specification as originally filed.

21. With respect to the features that constitute **new matter**, The examiner notes that no where in applicant's original disclosure does applicant describe the amended features of: "generating a gradient magnetic field to adjust the main magnetic field with a compensation signal" and generating the compensation signal, on the basis of said characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength" (i.e. of the main magnetic field). [See the response to arguments section above, for complete clarification of the examiner's specific position].

**New Matter and minor formal matters Preventing allowability of Application.**

22. If applicant can provide support for the amended limitations of July 18<sup>th</sup> 2005, then the application may be moved toward allowance, since the applicant will have distinguished the application from the applied prior art of record, however the grammatical concerns noted in the telephonic interview of September 28<sup>th</sup> 2005, would have to be addressed, along with ensuring proper citation of applicant's issued parent application **09/517,716** which issued as **US patent 6,731,113 B2** on May 4<sup>th</sup> 2004, along with a correction of figure 2, to become figure 2a and the insertion of Figure 2B which was a correction made to the parent application., since the current application is a continuation of the parent application and needs to be consistent with the teachings of the parent application.

**Claim Objections / Telephonic Interview**

23. The submitted claims of the July 18<sup>th</sup> 2005 amendment also have numerous grammatical errors, and singular / plurality problems which make the claims difficult to read.

24. The examiner contacted applicant's representative **David L. Barnes Reg. No. 47,407** on Wednesday September 28<sup>th</sup> 2005 to discuss how these claims could be amended to correct the numerous objections. An unofficial list of proposed claim

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corrections was provided to the examiner for consideration, [See the attachment to this office action].

25. However in view of the 112 first paragraph New Matter issues with amended claim 1, and therefore also concerning dependent claims 2-7, 9-14, 19 and 20;, the examiner cannot resolve the remaining grammatical issues, or ensure that the same changes made to the drawings in the parent application, are made in this continuing application, by examiner's amendment, because the examiner cannot rectify this 112 first paragraph problem.

#### **Prior art made of Record**

26. The **prior art made of record** and not relied upon is considered pertinent to applicant's disclosure.

A) **Lasarkis et al.**, US patent 5,304,934 issued April 19th 1994 [This reference supports the use of copper or aluminum in the construction of thermal shields, for the purpose of attaining a uniform temperature. See col. 8 lines 45-49]

B) **Kruspe et al.**, US patent 6,114,851 issued September 5th 2000, filed February 12th 1999. The entire reference is important because it suggests an NMR bore-hole application, that uses a compensated magnetic flux, in a temperature-dependent environment.

C) **Palkovich et al.**, US patent 5,551,243 issued September 3rd 1996, which teaches taking temperature measurements of at least one radiation shield in a superconductive magnet.

D) **Van Vaals et al.**, US patent 6,064,206 issued May 16th 2000 filed October 15th 1998.

E) **Keller et al.**, US patent 5,278,503 issued January 11th 1994.

F) **Watkins et al.**, US patent 6,252,405 B1 issued June 26th 2001 originally filed November 15th 1999.

G) **Yamaguchi et al.**, US patent 4,663,592 issued May 5th 1987.

H) **Ham et al.**, **US patent 6,371,113** issued May 2004. This reference is the parent application of applicant's instant continuation application, it is noted for a complete record but is not prior art against applicant's claims.

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I) \*Hasson et al., US patent 6,566,875 B1 issued May 20th 2003 originally filed June 16th 1999, with an effective US priority date of Feb. 23<sup>rd</sup> 1999. [This reference is still considered pertinent to the pending application because new matter cannot be introduced into an Request for Continued Examination, and should applicant remove the new matter added by the July 18<sup>th</sup> 2005 response. All of the prior art rejections, concerning Hasson et al., from the final office action of April 7<sup>th</sup> 2005 will again be applicable to the scope of the claims.]

\*\*\*\*\*

**Proposed Changes from the September 28<sup>th</sup> 2005 telephonic interview to correct claim problems if proper gradient coil adjustment support is provided.**

1. (Currently Amended) A method of determining a compensation signal for the compensation of a temporally varying field strength of the main magnetic field of a main magnet of a magnetic resonance imaging system that includes at least one gradient field coil for generating a gradient magnetic field to adjust the main magnetic field with a compensation signal, the method comprising:

determining at least one **characteristic** quantity which is characteristic (characteristic quantity) of a temperature-dependent magnetic property of a magnetizable material included as part of the magnetic resonance imaging system, and which interacts with the main magnetic field of such system, and

generating the compensation signal, on the basis of ~~said the~~ characteristic quantity, and providing the compensation signal to the gradient field coil for adjusting the temporally varying field strength **of the main magnetic field**.

2. (Currently Amended) A method as claimed in claim 1, wherein an electric signal applied to said the at least one gradient magnetic field coil is determined as ~~one a~~ characteristic quantity.

3. (Currently Amended) A method as claimed in claim 1, wherein a temperature of the magnetizable material is determined as ~~one a~~ characteristic quantity.

4. (Currently Amended) A method as claimed in claim 1, wherein the main magnet includes a main magnetic field coil having a resistance which is not negligibly small with respect to power dissipation, and wherein a ~~further~~ **characteristic** quantity which is characteristic of the temperature-dependent magnetic properties of the magnetizable material is determined from an amount of electric power dissipated ~~in~~ **by** the main magnetic field coil.

5. (Currently Amended) A method as claimed in claim 1, wherein the compensation signal is provided based on a predetermined functional relationship

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between the temperature-dependent magnetic properties of the magnetizable material and each relevant determined characteristic quantity.

6. (Currently Amended) A method as claimed in claim 5, wherein the predetermined functional relationship is recorded in a look-up table, including an input parameter, that is a representation of each determined characteristic quantity, and an output parameter that is a representation of the compensation signal of the at least one gradient coil.

7. (Currently Amended) A method as claimed in claim 1, wherein the MRI device includes an auxiliary gradient magnetic field coil for the compensation of the field strength of the main magnetic field, and ~~for compensating~~ wherein the main magnetic field is compensated by generating an auxiliary gradient magnetic field in conformity with the provided compensation signal.

8. (Cancelled)

9. (Currently Amended) A method as claimed in claim 1 wherein the magnetic resonance imaging system includes high-frequency (RF) oscillator means for energizing at least one high-frequency (RF) coil in conformity with the compensation signal.

10. (Currently Amended) A method as claimed in claim 9, wherein the frequency of the RF oscillator means is ~~adapted~~ adjusted prior to the application of one or more gradient magnetic field signals.

11. (Currently Amended) A method as claimed claim 1, wherein the magnetic resonance imaging system includes a processing means for processing an information signal acquired under the influence of the main magnetic field, ~~which~~ and wherein processing means ~~operating~~ operates in conformity with the compensation signal to provide a compensated information signal.

12. (Currently Amended) A method as claimed claim 1, wherein variations of the field strength of the main magnetic field are determined and compensated for, if when necessary, within one or more ~~times~~ time periods during an image data acquisition period.

13. (Currently Amended) A method as claimed in claim 1, further including a step of measuring variations of the field strength of the main magnetic field caused by ~~one or more of:~~ each determined characteristic quantity, wherein the determined characteristic quantity includes at least one of external magnetic fields, atmospheric pressure, and mechanical vibrations, ~~and wherein the step of providing includes generating~~ the degree of the compensation signal to the gradient field coil being based on a relevant functional relationship indicative of the effect of the ~~one or more further quantities~~ each determined characteristic quantity on the main magnetic field.

14. (Currently Amended) A device configured for magnetic resonance imaging comprising:

- a receiving space for accommodating an object to be imaged,
- a main magnet for generating a main magnetic field in the receiving space,
- at least one gradient field coil,
- at least one high-frequency (RF) coil,

means for determining at least one characteristic quantity which is characteristic of the temperature-dependent magnetic properties of a magnetizable material which is included as part of the magnetic resonance device, and which interacts with the magnetic fields of the device,

control means for energizing and controlling the main magnet, the gradient field coil and the RF coil, and

processing means coupled to the energizing and control means in order to determine a compensation signal to compensate for a provided to the gradient coil that compensates the temporally varying field strength of the main magnetic field in accord with the method claimed in of claim 1.

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Currently Amended) A method as claimed in claim 7, wherein the main magnet includes a main magnetic field coil with a resistance which is not negligibly small with respect to power dissipation, and compensating wherein the main magnetic field is compensated by controlling the electrical energizing of the main magnetic field coil based on the compensation signal applied to the gradient coil.

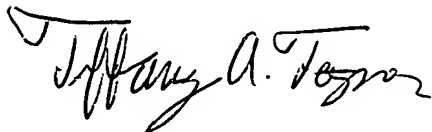
20. (Currently Amended) A method as claimed in claim 7, wherein the MRI device includes high-frequency (RF) oscillator means for energizing at least one high-frequency (RF) coil at a frequency that conforms with the compensation signal applied to the gradient coil.

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### Conclusion

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tiffany Fetzner whose telephone number is: (571) 272-2241. The examiner can normally be reached on Monday-Thursday from 7:00am to 4:30pm., and on alternate Friday's from 7:00am to 3:30pm.

28. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Diego Gutierrez, can be reached at (571) 272-2245. The **only official fax phone number** for the organization where this application or proceeding is assigned is (571) 273-8300.



TAF  
September 30, 2005



Diego Gutierrez  
Supervisory Patent Examiner  
Technology Center 2800